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April 10, 1997

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Federal Communications Commission
Office of Secretary

Mr. William F. Caton
Secretary
Federal Communications Commission
1919 M Street, N.W.
Room 222
Washington, D.C. 20554

Re: IB Docket No. 96-220, Notice of Ex Parte Presentation

Dear Mr. Caton:

Attached is a further ex parte submission of E-SAT, Inc. to be associated with the above docket.

Please advise the undersigned, if there are any questions concerning this matter.

Respectfully submitted,

Leslie A. Taylor
Counsel, E-SAT, Inc.

cc: Thomas Tycz, International Bureau
Harold Ng, International Bureau
Paula Ford, International Bureau
Julie Garcia, International Bureau
Ruth Milkman, International Bureau
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E-SAT Analysis Of DCAAS Users Band Sharing Opinions

Orbcomm is proposing a DCAAS system which has not been finalized, tested and verified through actual monitoring. There are five potential solutions to accommodate Orbcomm's proposed "requirements". These items are the following:

1. Spatial Diversity:
E-SAT can optimize the spatial diversity but with the E-SAT satellites in a single plane it is already somewhat optimized the theoretical upper limit of E-SAT uplink time from CONUS is less than 30% of each day. Going to two planes does not increase the system throughput and only increases the percentage of time that there will be a user uplinking from CONUS.

2. Frequency Diversity:
E-SAT is currently proposing to put its center frequency at 149.175 with a bandwidth of only 1.45 MHz. Under this band plan there will always be at least 19.5% of Orbcomm's band for which E-SAT's power level is below Orbcomm's stated cut off with DCAAS even with 81 concurrent users.

3. Transmit Power:
E-SAT's current system uses 1.00 dBW to uplink from each user set. If E-SAT utilized more encoding of the data stream and lowered the allowable bit error rate, then the power could probably be reduced by 3 dB (or more). This would directly translate into a decrease of 3 dB (or more) of received power at Orbcomm's satellite.

4. Concurrent Users:
The currently proposed maximum number of concurrent users is 81 on the E-SAT system. This number could be reduced as allowable by E-SAT's business base. Obviously, E-SAT will not need to utilize all 81 concurrent users when it launches its first constellation. E-SAT's business base will grow into some sizable fraction of this set of 81 concurrent users. If E-SAT were to reduce the maximum number of concurrent users to 40 there would be a reduction of 1.53 dB at Orbcomm's satellite. If E-SAT is using 20 concurrent users there is a reduction of 3.03 dB at Orbcomm's satellite.

5. Polarization Diversity:
E-SAT could utilize a polarization on its uplink that is the opposite sense to that of the receiving system on the Orbcommm satellite. In a perfect system (both on E-SAT's transmission and Orbcomm's reception) the isolation would be infinite. In a real world application this would realistically be 20 dB. It is safely 17dB or more. This means that the allowable PFD would be as high as -142 dBW and no lower that -145 dBW.

Analysis:
Most of the solutions will reduce the dB level at the DCAAS monitor. Depending on the final specifications of the monitor, the best solution will be selected. Based on Orbcomm's proposed specifications, putting a circularly polarized antenna on the user set

that transmits up in the opposite sense that Orbcomm receives provides the most reduction to interference. Since none of Starsys' calculation have been based upon any type of polarization diversity with E-SAT, there would be no impact on the Starsys system other than what they have already calculated and shown to E-SAT and others.

If Orbcomm's DCAAS rejects channels as currently proposed, E-SAT can develop a system that will be compatible with Orbcomm's DCAAS. Below is a synopsis of each system.

Orbcomm's stated DCAAS specifications:

Sensing Channel Bandwidth:	2.5 kHz
Sensing Channel Sensitivity level:	-167 dBW
Rejection "Channel Bandwidth":	7.5 kHz
Rejection "Channel" sensitivity:	-162 dBW
Rejection "Channel" rejection level:	-162 dBW
Satellite antenna full width:	104 degrees
Satellite antenna gain on center:	-2 dBi
Satellite antenna gain on beam edge:	+3 dBi
Satellite antenna receive polarization	Right Circular

As stated above, if Orbcomm's proposed DCAAS requirements are to be those specifications then E-SAT would design a system with the following specifications to be completely compatible with Orbcomm's DCAAS.

E-SAT's compatible user uplink system:

Center Frequency	149.175	MHz		
Bandwidth	1.450	MHz		
Transmitting RF Power	3.00	Watts	4.77	dBW
Transmitter Line Loss	0.77	dB	(0.77)	dB
Transmitting Antenna Gain	(3.00)	dBi	(3.00)	dB
EIRP per User			1.00	dBW
EIRP per User per 4 kHz			(24.59)	dBW
Free Space Path Loss (nadir to 750 km)	133.67	dB	(133.67)	dB
Atmospheric Loss	0.20	dB	(0.20)	dB
Rain Loss		dB	-	dB
Polarization Diversity	20.00	dB	(20.00)	dB

Antenna Pointing Loss	0.05	dB	(0.05)	dB
Received Power Flux Density per User			(152.92)	dBW
Received PFD per User per 4kHz			(178.51)	dBW
Received PFD per User per 7.5kHz			(175.78)	dBW
Received Power Flux Density for 81 concurrent users			(143.38)	dBW
Received PFD for 81 concurrent users per 4kHz			(168.97)	dBW
Received PFD for 81 concurrent users per 7.5kHz			(166.24)	dBW
Receiver Line Loss	-	dB	-	dB
Spacecraft Receiving Antenna Gain	(2.00)	dBi	(2.00)	dBi
Received Carrier Power per User			(154.92)	dBW
Received PFD per User per 4kHz			(180.51)	dBW
Received PFD per User per 7.5kHz			(177.78)	dBW
Received Power Flux Density for 81 concurrent users			(145.38)	dBW
Received PFD for 81 concurrent users per 4kHz			(170.97)	dBW
Received PFD for 81 concurrent users per 7.5kHz			(168.24)	dBW
Margin below Orbcomm's DCAAS			6.24	dBW
Peak 7.5 kHz band:				
Received PFD for 81 concurrent users per 4kHz			(168.55)	dBW
Received PFD for 81 concurrent users per 7.5kHz			(165.82)	dBW
Maximum margin below Orbcomm's DCAAS			3.82	dBW